(12) UK Patent Application (19) GB (11) 2 256 155 (13) A

(43) Date of A publication 02.12.1992

(21) Application No 9111452.0

(22) Date of filing 28.05.1991

(51) INT CL[5]
B01D 36/04

(52) UK CL (Edition K)
B1D DNRS DPNA
U1S S1434 S1443

(56) Documents cited
WO 88/05334 A1 US 4228006 A US 3318449 A

(58) Field of search
UK CL (Edition K) B1D DNRS DPLC DPMX DPNA
INT CL[5] B01D 36/00 36/04

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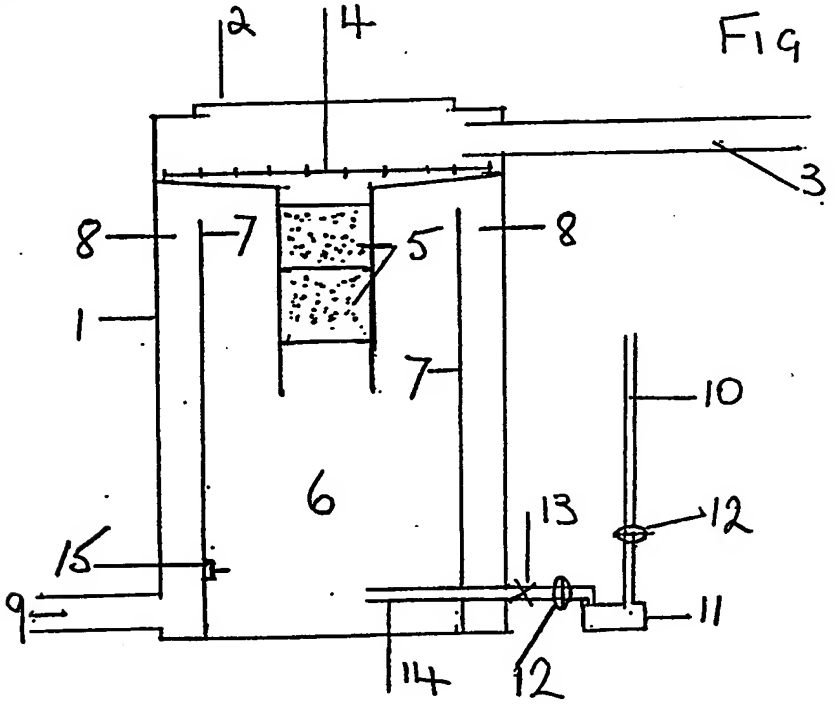
(54) Domestic water recycling system

(57) Used water from around the home, and rain water, are purified in a first tank 1, then fed to respective storage tanks (Figs 2, 3) for flushing toilets and watering the garden. The water flows into tank 1 by inlet 3 through filter mesh 4 and foam filters 5 of different pore sizes.Tank 1 has a peripheral weir 7 over which excess water and soap bubbles flow to outlet 9, leading to an underground tank (Fig. 3), also equipped with filters and an overflow, together with a pump and tap for use when watering the garden. Tank 1 has a pump 11 which delivers cleaned water to a toilet flush supply tank (Fig. 2), containing disinfecting/ colouring chemical. Pump 11 is controlled by level sensors 15, (19) in both tanks, so that a minium level is maintained in tank 1. The toilet supply tank also has a ball valve fed by the mains, in case tank 1 fails to supply enough water.

Fig 1



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The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

(PANEL E)

FIG 2

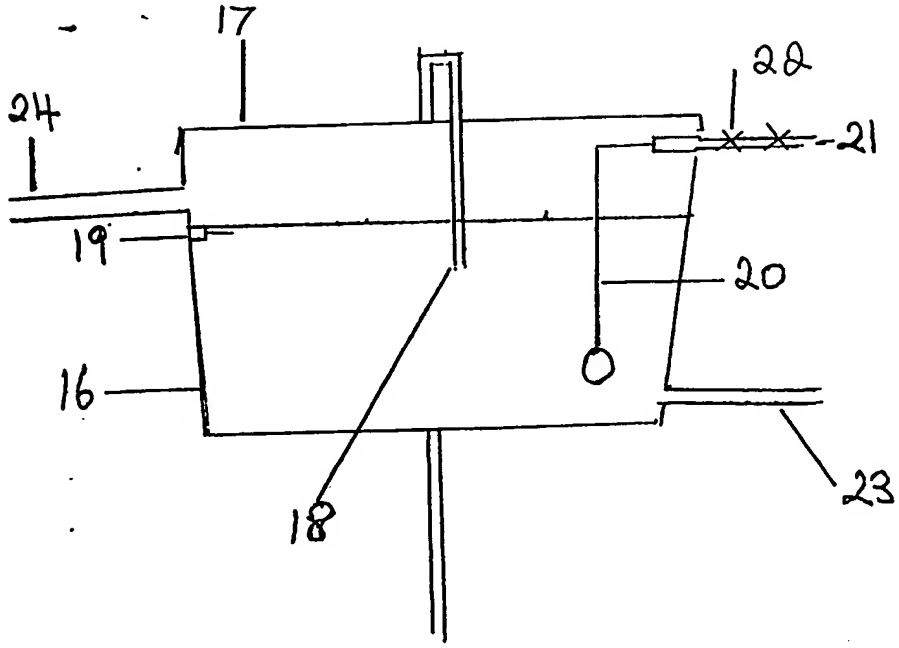
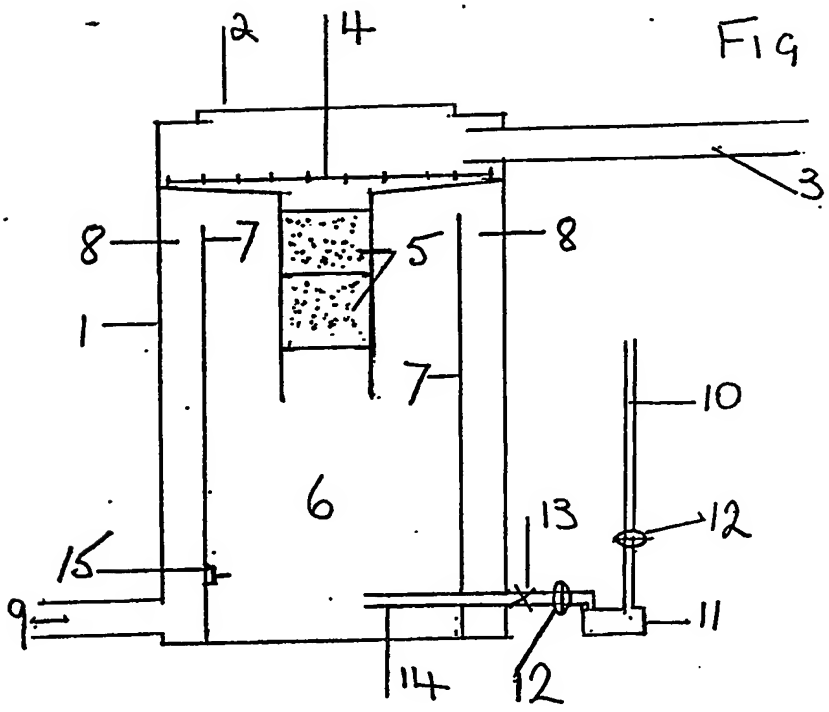
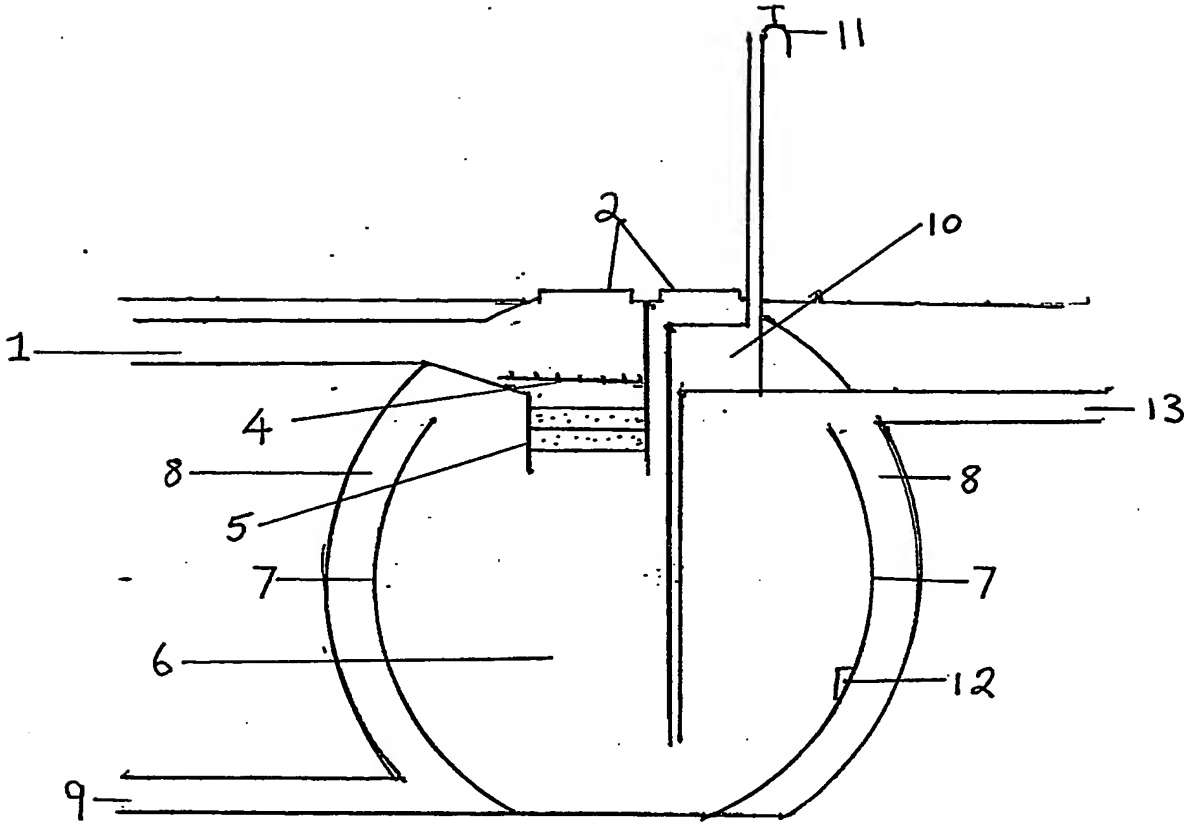


FIG 1



(PANEL F)

Fig 3



(PANEL A)

-1-

WASTE WATER RECLAIMING SYSTEM

This invention relates to a waste water reclaiming system.

Domestic and Commercial properties are using thosands of litres of water every year. A large proportion of this water is used once and then runs away down waste pipes and into drainage systems. At present there is no system available to re-use or re-claim any of this water.

These are some figures provided by the Southern Water Authority as to the average usage of water everyday:

25 litres of each person water each day for personal use.

100 litres in every bath.

20 litres for every shower.

7-9 litres every time the toilet is flushed.

115 litres every full washing machine cycle.

50 litres for every dishwasher.

Approximately one third of all clean water used in a home is flushed down lavatory systems.

Both Nationally and Worldwide water shortage is becoming increasingly recognised as a major problem, indeed already hosepipe bans and other types of water restrictions are commonplace during certain months of the year and the potential introduction of water meters looks more and more likely. Water meters already exit in many European Countries where water has become an increasingly expensive commodity.

A waste water reclaiming system, (waste water in this context including all waste water, including rain water, but excluding toilet waste) comprising a main free standing moulded plastic unit, to which all selected waste water is piped. This main unit having a removable large diameter plastic lid and housing integral means of water cleaning and filtration, provided by a fine mesh grill and two man made foam fibre filters through which all incoming water must pass. The fine mesh grill and both the filters are easily accessible with the unit lid off and are installed so as to be easily removable for cleaning or replacing purposes. The physical construction of an inner wall,

which runs right around the perimiter of the wall of the main unit, forming a gap between the two in the lower half of the internal part of the main unit, provides the means of seperating and removing excess water and soap bubbles. This excess water and soap bubbles then passes over the lip of this inner wall, into the aforesaid gap created, and is then piped away.

. A pump is mounted alongside the main unit and pumps cleaned/filtered water from inside this main unit to a remote plastic holding tank. The operation of the pump is controlled by two liquid level sensors one inside the holding tank and the other inside the main unit, this mantains a minimum level of water in the main unit at all times. The water entering this holding tank is treated with a chemical agent present in the tank which disinfects and colours it. The remote holding tank is connected to all or some of the toilet cisterns within the building where it is sited and is capable of supplying these cisterns with its stored cleaned/filtered and chemically treated water. Inside the holding tank there is also a long arm ball valve which allows water in from a mains supply pipe if the water in the holding tank falls below a certain level, therebye mantaining a supply of water for flushing toilets at all times, even if the main unit is out of operation. Connected to the pipe supplying the clean mains water, is a series of non-return valves. The holding tank also has an overflow pipe.

The excess water and soap bubbles are piped out of the main unit using a gravity system and can either go down into the drain or into a holding tank fitted below ground level outside the building where the unit is installed. This holding tank has a removable plastic lid for access and a grill and filter system through which the incoming water must pass. As in the main unit both this grill and the filters are easily accessible and removable for cleaning/replacing purposes. A pump can be installed inside this holding tank if required, therebye enabaling the water held inside it to be used for watering the garden. Excess water entering this holding tank is piped into an underground soakaway or into the drain.

The specifics of the invention will now be shown by way of example with reference to the accompanying drawing in which :-

FIG 1. shows the main cleaning/filtration unit to which all selected waste water is piped.

FIG 2. shows the holding tank installed within the building and to which all cleaned/reclaimed water is pumped/treated and stored.

FIG 3. shows the optional underground holding tank used to collect and store all excess and soapy water, for use in the garden.

The waste water reclaiming system comprises a square moulded plastic main unit(FIG 1/1)The unit has a large diameter round plastic lid (FIG 1/2)which is watertight when in place and secures and removes using a screw thread fitting. All selected waste water,excluding toilet waste,is then piped into the top side of the main unit (FIG 1/3)using one of four fixings points provided.The incoming water then passes through a fine mesh grill(FIG 1/4)which catches any large particles carried within.This fine mesh grill is made up off two parts which are installed so as to be accessible and easily removable when the unit lid is off.This allows the grill to be removed for washing or replacing.

Having passed through the grill the water then passes through two filters (FIG 1/5)mounted directly below it.These filters are constructed of man made foam fibre material(similar to the type used for garden pond filters) the lower one of which is finer than the first.Both are installed so as to be easily accesible and removable for cleaning or replacing with the unit lid off.The water then falls through the lowest filter and into the internal chamber(FIG 1/6).

As this water falls into the internal chamber it causes any soap present in it to bubble up and rise to the surface.The water level rises rapidly and the soap bubbles and any excess water flow over the lip of the wall of the internal chamber (FIG 1/7)and into the gap between the wall of this chamber and the wall of the main unit(FIG 1/8).This gap runs around the complete perimeter of the inner and outer walls and this excess water and soap bubbles are piped away via a low level pipe(FIG 1/9) fitted to one of four possible blind entry point provided on each side of the unit.The excess water and soap bubbles flow down this pipe and either directly into the drain or into an underground holding tank (FIG 3)outside of the building where the main unit is installed.(See last paragraph)

As all this is going on clean,relatively soap free water is pumped via a pipe fitted into the base of the internal chamber(FIG 1/14) to a remote holding tank within the building(FIG 2)The operation of the pump(FIG 1/11) is controlled by two water level sensors,one situated in the holding tank (FIG 2/19)and one situated in the internal chamber of the main unit(FIG 1/15).The water level sensor ensures a minimum level of water is held in the internal chamber of the main unit at all times. Situated in the pipe,just before the pump position is a non return valve (FIG 1/13)which ensures the pump is primed at all times.There are also two isolating valves (FIG 1/12)provided in the pipe both before and after the pump to allow the pump to be isolated in the event of it breaking down and needing removal for repair.

The remote internal holding tank (FIG 2) comprises a main moulded plastic body(FIG 2/16)with a plastic lid (FIG 2/17)with a means of removal for access.The cleaned/filtered water enters the holding tank via a pipe entry point provided in the aforesaid lid(FIG 2/18).The liquid level sensor (FIG 2/19)controls the maximum level of water pumped to the tank.The water entering the tank is treated with a chemical agent present in the tank which colours and disinfects it.Inside the holding tank there is also a long arm ball valve (FIG 2/20)which allows water in from a mains supply pipe (FIG 2/21) if the water level in the holding

tank falls below a minimum level, this ensures there is always water available in the tank. Connected to the mains supply pipe is a double non-return valve (FIG 2/22) on the opposite side to the mains supply pipe there is an overflow pipe (FIG 2/24). The holding tank is connected to all or some of the toilet cisterns within the building and is capable of supplying these with water for flushing at all times even if the reclaiming unit is not in operation.

The excess water and soap bubbles from the main unit are piped out of the main unit using a gravity system and can either go into the drain or into the underground moulded plastic holding tank (FIG 3) as previously mentioned. This water enters the tank through the entry point provided (FIG 3/1). The tank has a screw fitting removable plastic lid (FIG 3/2) for access and a grill (FIG 3/4) and filter system (FIG 3/5) through which the incoming water must pass. As in the main unit this grill and the filters are installed so as to be easily removable when the tank lid is taken off. The water falling through the filters is collected in a second internal chamber (FIG 3/6) and any excess flows over these internal chamber walls (FIG 3 /7) and into the gap created between the wall of the internal chamber and the external wall of the main tank body. (FIG 3/8) as in the main unit), this excess water is then piped away (FIG 3/9) to either a soakaway or the drain system. A pump (FIG 3/10) is installed in the internal chamber and is connected to an outlet tap (FIG 3/11) provided above ground level so that this stored water can be used for watering the garden. A minimum level of water is maintained within the tank using a water level sensor (FIG 3/12) in the internal chamber of the tank. An overflow pipe (FIG 3/13) is provided for additional excess water protection.

(PANEL E)

CLAIMS

1. A Waste Water Reclaiming System, (waste water in this context includes all waste water and rain water, but excludes toilet waste) and comprises a main free standind moulded plastic unit, to which all selected waste water is piped. This main unit having a removable large diameter plastic lid and housing integral means of water cleaning and filtration, provided by a fine mesh grill and two man made fibre filters through which all incoming water must pass. The fine mesh grill and both the filters are easily accessible with the unit lid off and are installed so as to be easily removable for cleaning or replacing purposes. The physical construction of an inner wall which runs right around the perimeter of the wall of the main unit, forming a gap between the two in the lower half of the internal part of main unit, this provides the means of seperating and removing any excess water and/or any soap bubbles. This excess water and any soap bubbles then passes up and over the lip of this inner chamber wall, into the aforesaid gap created , and is then piped away.

A pump is mounted alongside the main unit and pumps cleaned/filtered water from inside this main unit to a remote plastic holding tank. The operation of this pump is controlled by two liquid level sensors one inside the holding tank and the other inside the main unit, this maintains a minimum level of water in the main unit at all times. The water entering the holding tank is treated with a chemical agent present in the tank which disinfects and colours it. The remote holding tank is connected to some or all of the toilet cisterns within the building where it is sited and is capable of supplying these cisterns with clean/filtered and chemically treated water. Inside the holding tank there is also a long arm ball valve which allows water in from a mains water supply pipe if the water in the holding tank falls below a certain level, therebye maintaining a supply of water for flushing the toilets at all times, even if the main unit is out of operation. Connected to the pipe supplying the clean mains water, is a series of non-return valves. The holding tank also has an overflow pipe.

The excess water and soap bubbles are piped out of the main unit using a gravity system and can either go down into the drain or into a holding tank fitted below ground level outside the building where the unit is installed . This holding tank has a removable plastic lid for access and a grill and filter system through which all incoming water must pass. As in the main unit both the grill and the filters are easily accessible and removable for cleaning/replacing purposes. A pump can be installed inside this holding tank if required, therebye enabling the water held inside it to be used for watering the garden. Excess water entering this holding tank is piped away into an underground soakaway or into the drain.

CLAIMS CONT'D

2. A Waste Water Reclaiming System as described herein with reference to Figures 1 to 3 as enclosed.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number
9111452.0

Relevant Technical fields

(i) UK Cl (Edition K) B1D (DNRS,DPLC,DPMX,DPNA)

(ii) Int Cl (Edition 5) B01D (36/00, 36/04)

Search Examiner
R T HAINES

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search
9 OCTOBER 1991

Documents considered relevant following a search in respect of claims 1,2

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	WO 88/05334 A1 (KAMBANELLAS)	1
X	US 4228006 A (HANNA)	1
X	US 3318449 A (JENNINGS)	1

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

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